(P 103) Conversion of Corallina Officinalis into Calcium Phosphates by using Hydrothermal Treatment and their Potential for Bone Tissue Engineering Application

S. Gomes[1,2], M.T. Rodrigues[1,2], I.B. Leonor[1,2], M.E. Gomes[1,2], J.F. Mano[1,2], R.L. Reis[1,2]

[1]3B's Research Group—Biomaterials, Biodegradables and Biomimetics, Dept. of Polymer Engineering, University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal, www.3bs.uminho.pt
[2]IBB—Institute for Biotechnology and Bioengineering, PT Government Associated Laboratory, Braga, Portugal

Calcium phosphates (CaP) such as hydroxyapatite (HA) and tricalcium phosphate are widely used in bone Tissue Engineering, due to their biocompatibility, osteoinductive and/or osteoconductive properties. The aim of this work is to obtain CaP through the hydrothermal conversion of the calcite (HCC) present in the alga C. officinalis. To promote the HCC into CaP, the alga was immersed in a phosphate solution (Ps) and subjected to a hydrothermal treatment. Different Ps concentrations were used to test the influence of this parameter on the HCC into CaP and on the type of CaP formed. FTIR, EDS and XRD analyses demonstrated the successful conversion of the C. officinalis calcite into HA, after treatment with a 0.1M Ps, and into a mixture of HA and whitlockite, after treatment with a 0.5M Ps. Moreover, the SEM analysis showed that this treatment allowed the preservation of the original porous structure of this alga. A cellular study was also performed in order to evaluate the capacity of these CaPs to support the proliferation and differentiation of goat bone marrow cells (GBMCs) into osteoblasts. GBMCs were seeded onto PCL membranes with the CaP granules obtained by HCC. Cells were cultured under static conditions in osteogenic medium for 7, 14 and 21 days. GBMCs seeded on C. officinalis-PCL membranes showed a higher cell viability and proliferation when compared with GBMCs seeded onto PCL (polycaprolactone) membranes without CaPs, the positive control, indicating that the obtained CaPs are suitable for bone tissue engineering applications.